

SOUTHWEST FISHERIES SCIENCE CENTER
THIRD QUARTER REPORT-FY 2002
For the Period April 1 - June 30, 2002

SUBMITTED BY: John Hunter, Division Director, Fisheries Resources Division

Title of Accomplishment or Milestone: Testing of acoustic demography application for fish (FRD)

Current Status of Accomplishment or Milestone: In September 2001 the first trial was completed and the first manuscript was delivered at Montpelier France Acoustics Conference. The second field trial is planned for August 2002 from the SIO vessel R/V Sproul and the fishing vessels Rosemarie C., a net reel seiner, and the Karen Marie, a trawler.

Background: Sustainability of commercial fishing depends on critical measures of recruitment. Recruitment rates in Coastal Pelagic Species (CPS) are linked to mortality and growth in the post-larval phase of cohort development. Older systems for estimating growth rate of schooling fishes required sound levels not now permitted in the marine ecosystem. Estimations of mortality rate are hampered by imprecise and inaccurate methods of survey of juvenile fishes. Acoustic demography affords a method for non-invasive 'sampling' of large sectors of ocean area which in sequence could yield estimates of growth and survival.

Purpose of Activity: To apply environmentally benign, modern and novel techniques to estimate the growth and survival of recruit stage fishes including sardine and anchovy. This builds on a previous accomplishment at this lab of estimating growth from spectral analysis of echo returns from schooling fish to identify size modes in spring, summer, and fall. It also builds on acoustic research in the U.K. and in the Mediterranean using 21st Century electronics and acoustical devices.

Description of Accomplishment (e.g., to the Center, to Management, and to NMFS Strategic Plan Goals) and significant results: Following the completion of engineering, we participated in a field test of the system in September. Personnel involved in the field study were Dr. David Demer, Jennifer Emory, Ron Dotson, and Dmitry Abramenkoff. Involved in the analysis of the specimens and data were Dr. David Demer, Dr. Paul Smith, Dmitry Abramenkoff and Darrin Bergen. A manuscript has been completed for the initial trials entitled

"The potential of bioacoustic absorption spectroscopy for estimation of number densities vs. fish size and depth."

Authored by:

Orest Diachok, Paul Smith, George Cavanaugh, W. Hodgkiss, Stephen Wales, and David Demer

Significance of Accomplishment: Recruitment of commercial fish species cannot as yet be predicted. This is because the theory, accuracy, and precision of the measurements of stages of the life cycle are not amenable to evaluation in the same year as the recruitment occurs. Instead estimation of recruitment is delayed several years until the cohort has passed through the years of vulnerability to fishing mortality. For pelagic fish with air bladders this technique is amenable to further development for first, describing the recruitment process in the ensuing year and second, for gathering multivariate information on the controls of recruitment rate. The completed sequence should allow recruitment prediction from first principles or indices in the season prior to recruitment.

Problems: None

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